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मानक

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“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

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“Step Out From the Old to the New”

IS 1156 (1957): Pearl Barley [FAD 16: Foodgrains, Starches and Ready to Eat Foods]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 1156 - 1957

Reaffirmed 2010

Indian Standard

SPECIFICATION FOR

PEARL BARLEY

U.D.C.

633.16 (083.75) (54)

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MANAK BHAVAN, 9 MATHURA ROAD
NEW DELHI 1

Price Rs. 1.00 Gr 4

January 1958

AMENDMENT NO. 1 JULY 1965
TO
IS : 1156-1957 SPECIFICATION FOR PEARL BARLEY

Alterations

(*Clause 0.5, line 5*) — Substitute 'IS : 460-1962 Test Sieves (*Revised*)' for 'IS : 460-1953 Test Sieves'.

(*Clause 0.5.1, line 3*) — Substitute 'IS : 460-1962' for 'IS : 460-1953'.

(*Clause 3.1, first sentence*) — Substitute the following for the existing sentence:

'The material shall be manufactured from sound and cleaned barley (*Hordeum vulgare* or *H. distichon*)'.

(*Pages 3 and 4, Appendix A*) — Substitute the following for the existing appendix:

' A P P E N D I X A

(*Clause 2.1*)

SAMPLING OF PEARL BARLEY

A-1. GENERAL REQUIREMENTS OF SAMPLING

A-1.0 In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

A-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

A-1.2 The sampling instrument shall be clean and dry when used.

A-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

A-1.4 The samples shall be placed in clean, odourless and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample.

A-1.5 Each container shall be sealed air-tight after filling and marked with full details of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment.

A-1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

A-1.7 Sampling shall be done by a person agreed to between the purchaser and the vendor and in the presence of the purchaser (or his representative) and the vendor (or his representative).

A-2. SCALE OF SAMPLING

A-2.1 Lot — All the containers in a consignment belonging to the same batch of manufacture shall constitute a lot.

A-2.1.1 Samples shall be tested from each lot for ascertaining conformity of the material to the requirements of the specification.

A-2.2 The number of containers to be tested from a lot shall depend on the size of the lot and shall be in accordance with Table II.

TABLE II NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING

TOTAL NUMBER OF CONTAINERS IN THE LOT	NUMBER OF CONTAINERS TO BE SELECTED
N (1)	n (2)
3 to 50	3
51 „ 200	4
201 „ 400	5
401 „ 650	6
651 and over	7

A-2.3 The containers to be selected for sampling shall be chosen at random from the lot, and, for this purpose, random number tables shall be used. In case such tables are not available, the following procedure may be adopted:

Starting from any container, count them as 1, 2, 3....., r and so on, in a systematic manner. Every r th container thus counted shall be chosen, r being the integral part of N/n , where N is the total number of containers in the lot and n the number of containers to be selected (see Table II).

A-3. TEST SAMPLES AND REFEREE SAMPLES

A-3.1 Preparation of Individual Samples — Empty out the contents of the container on a sheet of paper and mix thoroughly. Cone and quarter as often as necessary till about 600 g of the material is left. From this, take about 400 g of the material and divide it into three approximately equal parts. Each part so obtained shall constitute an individual sample

Indian Standard

SPECIFICATION FOR PEARL BARLEY

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 21 November 1957, on approval by the Agricultural and Food Products Division Council of the draft finalized on 23 September 1957, by the Edible Starches, Confectionery and Cereal Products Sectional Committee.

0.2 Pearl barley is manufactured by gradual abrading of the husk and then the outer portion of the barley kernel — the abrading (popularly known as pearling) continued till the grains become rounded or pearly and get polished so that the endosperm is as white as possible. Pearl barley should be made from well-filled barley, devoid of discoloured or shrivelled kernels and of foreign matter or other grains.

0.3 The Sectional Committee responsible for the preparation of this standard has based it on the actual data available on the composition of pearl barley as manufactured in India from both imported as well as indigenous barley. Nevertheless, due weightage has also been given to the need for co-ordination between the standards prevailing in various countries. This consideration led the Sectional Committee to refer to US Federal Specification No. N-B-121, dated 26 October 1950, for Barley, Pearl.

In addition to the above, due consideration has also been given to the relevant rules prescribed by the Government of India under the Prevention of Food Adulteration Act, 1954. Still, this standard is subject to the restrictions imposed under that Act, wherever applicable.

0.4 This standard is one of the two Indian Standard Specifications for Processed Barley. The other specification is IS: 1157-1957 Barley Powder.

0.5 This standard requires reference to the following Indian Standard Specifications:

IS: 265-1950 HYDROCHLORIC ACID

IS: 266-1950 SULPHURIC ACID

IS: 460-1953 TEST SIEVES

IS: 1070-1957 DISTILLED WATER

0.5.1 Wherever a reference to any specification mentioned under 0.5 appears in this standard, except IS: 460-1953 it shall be taken as a reference to the latest version of the specification.

0.6 The Government of India have decided to introduce throughout the country uniform weights and measures based on the metric system. Therefore, the quantities in this standard have been given in metric units.

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS: 2-1949 Rules for Rounding Off Numerical Values; the number of places retained in the rounded off value should be the same as those of the specified value in the standard.

0.8 This standard is intended chiefly to cover the technical provisions relating to the supply of the material, and it does not include all the necessary provisions of a contract.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of test for pearl barley.

2. SAMPLING

2.1 Representative samples of the material shall be drawn according to the method prescribed in Appendix A.

3. REQUIREMENTS

3.1 The material shall be manufactured essentially from sound and clean barley (*Hordeum vulgare*). It shall be whitish in colour and shall be free from fermented, musty or other objectionable taste and odour, facings (mineral or otherwise) and adulterants.

NOTE — The colour, taste and odour shall be determined by organoleptic tests.

3.2 Barley-Grain Content — When examined by the method given in Appendix B, the barley-grain content shall be not less than 98.9 percent by weight. Matter other than barley shall have not more than 1.0 percent by weight of "food grains other than barley" and not more than 0.1 percent by weight of "foreign matter."

3.2.1 Damaged Grains — When determined by the method given in Appendix B, the total quantity of grains damaged by heat, insects, moulds or other disease shall be not more than 2.0 percent by weight.

3.3 The material shall also conform to the requirements given in Table I.

4. TESTS

4.1 Tests shall be carried out as prescribed under 3.1 and in the appropriate appendices specified under 3.2, 3.2.1 and in col 4 of Table I.

TABLE I CHEMICAL REQUIREMENTS FOR PEARL BARLEY

(Clauses 3.3 and 4.1)

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST (REF TO APPENDIX)
(1)	(2)	(3)	(4)
i)	Moisture, percent by weight, <i>max</i>	12.5	C
ii)	Total ash (on dry basis), percent by weight, <i>max</i>	1.0	D
iii)	Acid insoluble ash (on dry basis), percent by weight, <i>max</i>	0.05	E
iv)	Protein (on dry basis), percent by weight, <i>min</i>	7.0	F
v)	Crude fibre (on dry basis), percent by weight, <i>max</i>	0.50	G
vi)	Alcoholic acidity (as H ₂ SO ₄) with 90 percent alcohol, percent by weight, <i>max</i>	0.10	H

4.2 Quality of Reagents

4.2.1 Unless specified otherwise, pure chemicals shall be employed in tests, and distilled water (see IS: 1070-1957) shall be used where the use of water as a reagent is intended.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

5. PACKING AND MARKING

5.1 Packing — Unless otherwise agreed between the purchaser and the vendor, the material shall be packed in clean, sound and dry double jute bags, the inner one of which shall be new A-twill or in air-tight containers made of tinplate or other suitable material.

5.1.1 When the material is packed in bags (see 5.1), the mouth of each bag shall be either machine stitched or rolled over and hand stitched; if hand stitched, the stitches shall be in two rows with at least 14 stitches in each row.

5.2 Marking — The following particulars shall be clearly and indelibly marked on each package:

- Name of the material,
- Name of the manufacturer,
- Batch or code number, and
- Net weight.

5.2.1 Each package may also be marked with the ISI Standard Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, 1952 and the Rules and Regulations made thereunder. Details of conditions under which a licence for the use of ISI Certification Mark may be granted to manufacturers or processors may be obtained from the Indian Standards Institution.

APPENDIX A

(Clause 2.1)

SAMPLING OF PEARL BARLEY**A-1. GENERAL REQUIREMENTS OF SAMPLING**

A-1.0 In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

A-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

A-1.2 The sampling instrument shall be clean and dry when used.

A-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

A-1.4 The samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample.

A-1.5 Each container shall be sealed air-tight after filling and marked with full details of sampling, date of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment.

A-1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

A-1.7 Sampling shall be done by a person agreed between the purchaser and the vendor and in the presence of the purchaser (or his representative) and the vendor (or his representative).

A-2. SCALE OF SAMPLING

A-2.1 Lot — All the containers in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot. If the consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

A-2.2 Gross Sample — For the purpose of drawing samples for test, a number of containers shall be selected at random from a lot. This number of containers in relation to the size of the lot, or the scale of sampling, shall be subject to an agreement between the purchaser and the vendor. As a guide to such an agreement, a scale of the size of the sample is suggested in Table II.

TABLE II MINIMUM NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING FROM VARIOUS SIZES OF LOTS

(Clause A-2.2)

LOT SIZE	SAMPLE SIZE
2 to 8	2
9 „ 27	3
28 „ 64	4
65 „ 125	5
126 „ 216	6
217 „ 343	7
344 „ 512	8
513 „ 729	9
730 „ 1 000	10
1 001 „ 1 331	11

A-3. TEST SAMPLES AND REFEREE SAMPLE

A-3.1 Preparation — To prepare a set of test samples, draw with an appropriate sampling instrument from different parts of each container in the gross sample, about 0.75 kg of the material and mix thoroughly to form a composite sample of that container. Divide the composite sample of each container into three equal parts; each part shall form a reduced sample for that container. A set of such reduced samples, consisting of the reduced sample from each container shall constitute the test sample.

A-3.2 Three sets of test samples, each sample being not less than 250 g shall be transferred immediately to thoroughly clean and dry containers and sealed air-tight. This shall be labelled with particulars given under A-1.5. One set of test samples shall be sent to the purchaser and one to the vendor.

A-3.3 Referee Sample — The third set of test samples, bearing seals of the purchaser and the vendor, shall constitute the referee sample, to be used in case of dispute between the purchaser and the vendor. It shall be kept at a place agreed between the purchaser and the vendor.

A-4. TEST FOR ACCEPTANCE

A-4.1 Examination and Tests — The purchaser may examine and test each of the reduced samples constituting a test sample separately for compliance with the requirements of this standard or he may prepare, for the purpose of such examination and at any stage of the progress of the examination, a composite sample representative of the whole lot, by mixing all the reduced samples constituting the test sample.

A-4.2 Criterion for Judgement — When the individual reduced samples in a test sample are separately examined and the results vary from one reduced sample to another, the criterion for judging the quality of the lot for the purpose of acceptance on the basis of the results obtained shall be at the discretion of the purchaser, unless otherwise previously agreed between the purchaser and the vendor.

APPENDIX B

(Clauses 3.2 and 3.2.1)

DETERMINATION OF BARLEY-GRAIN CONTENT

B-1. PROCEDURE

B-1.1 Weigh accurately about 100 g of the material. Spread it out on a large sheet of paper. Pick out, using a forceps, 'food grains other than barley', foreign matter (see 3.2) and damaged grain kernels (see 3.2.1) and form three separate groups. Weigh each group accurately.

B-2. CALCULATION

B-2.1 Percent by weight, of each group = $\frac{100 W_2}{W_1}$

where

W_2 = weight in g of the group, and
 W_1 = weight in g of the material taken for the test.

B-2.2 Barley-grain content = 100 - (percent 'food grains other than barley' + percent foreign matter).

APPENDIX C

[Table I, Item (i)]

DETERMINATION OF MOISTURE

C-1. PROCEDURE

C-1.1 Preparation of Sample — Grind in a pestle and mortar about 100 g of the material

so that at least 90 percent passes through IS Sieve 40 (ASA Test Sieve 40, BS Test Sieve 36 or Tyler Test Sieve 35). Transfer this prepared sample to a well stoppered glass bottle

for use as indicated under C-1.2, F-3.1, G-2.1 and H-2.1.

C-1.2 Weigh accurately about 5 g of the *prepared* sample in a dish made of porcelain, silica or platinum, previously dried in an electric oven and weighed. Place the dish in an electric oven maintained at $105^{\circ} \pm 1^{\circ}\text{C}$, for five hours. Cool the dish in a desiccator and weigh with the lid on. Repeat the process of heating, cooling and weighing at half hour intervals until the loss in weight between two successive weighings is less than one milligram. Record the lowest weight obtained.

NOTE — Preserve the dish containing this dried material for the determination of total ash (see D-1.1).

C-2. CALCULATION

C-2.1 Moisture,
percent by weight = $\frac{100 (W_1 - W_2)}{W_1 - W}$

where

W_1 = weight in g of the dish with the *prepared* sample before drying,
 W_2 = weight in g of the dish with the *prepared* sample after drying, and
 W = weight in g of the empty dish.

APPENDIX D

[Table I, Item (ii)]

DETERMINATION OF TOTAL ASH

D-1. PROCEDURE

D-1.1 Ignite the dried material contained in the dish (see C-1.2) with the flame of a Meker burner for about one hour. Complete the ignition by keeping in a muffle furnace at $600^{\circ} \pm 20^{\circ}\text{C}$ until grey ash results. Cool in a desiccator and weigh. Repeat the process of igniting, cooling and weighing at half hour intervals until the difference in weight between two successive weighings is less than one milligram. Note the lowest weight.

NOTE — Preserve the dish containing this ash for the determination of acid insoluble ash (see E-2.1).

D-2. CALCULATION

D-2.1 Total ash
(on dry basis),
percent by weight = $\frac{100 (W_2 - W)}{W_1 - W}$

where

W_2 = weight in g of the dish with the ash,
 W = weight in g of the empty dish, and
 W_1 = weight in g of the dish with the dried material (see W_2 under C-2.1).

APPENDIX E

[Table I, Item (iii)]

DETERMINATION OF ACID INSOLUBLE ASH

E-1. REAGENT

E-1.1 Dilute Hydrochloric Acid — approximately 5 N, prepared from concentrated hydrochloric acid (see IS: 265-1950).

E-2. PROCEDURE

E-2.1 To the ash contained in the dish (see D-1.1) add 25 ml of dilute hydrochloric acid, cover with a watch glass and heat on a water bath for 10 minutes. Allow to cool and filter the contents of the dish through Whatman filter paper No. 42 or its equivalent. Wash the filter paper with water until the washings are free from the acid and return it to the dish. Keep it in an electric air oven maintained at $135^{\circ} \pm 2^{\circ}\text{C}$ for about 3 hours. Ignite in a muffle furnace at $600^{\circ} \pm 20^{\circ}\text{C}$ for one hour. Cool the dish in a desiccator and weigh. Repeat

the process of igniting in the muffle furnace, cooling and weighing at half hour intervals until the difference in weight between two successive weighings is less than one milligram. Note the lowest weight.

E-3. CALCULATION

E-3.1 Acid insoluble ash
(on dry basis),
percent by weight = $\frac{100 (W_2 - W)}{W_1 - W}$

where

W_2 = weight in g of the dish with the acid insoluble ash,
 W = weight in g of the empty dish, and
 W_1 = weight in g of the dish with the dried material (see W_2 under C-2.1).

APPENDIX F

[Table I, Item (iv)]

DETERMINATION OF PROTEIN

F-1. APPARATUS

F-1.1 Kjeldahl Flask — 500 ml capacity.

F-1.2 Distillation Assembly — The assembly consists of a round bottom flask of 1 000 ml capacity fitted with a rubber stopper through which passes one end of the connecting bulb tube. The other end of the bulb tube is connected to the condenser which is attached by means of a rubber tube to a dip tube which dips into a known quantity of standard sulphuric acid contained in a beaker of 250 ml capacity.

F-2. REAGENTS

F-2.0 The following reagents are required.

F-2.1 Anhydrous Sodium Sulphate

F-2.2 Copper Sulphate

F-2.3 Concentrated Sulphuric Acid — sp-gr 1.84 (see IS:266-1950).

F-2.4 Sodium Hydroxide Solution — Dissolve about 225 g of sodium hydroxide in 500 ml of water.

F-2.5 Standard Sulphuric Acid — approximately 0.1 N.

F-2.6 Methyl Red Indicator Solution — Dissolve one gram of methyl red in 200 ml of rectified spirit (95 percent by volume).

F-2.7 Standard Sodium Hydroxide Solution — approximately 0.1 N.

F-3. PROCEDURE

F-3.1 Transfer carefully about one gram of the prepared sample (see C-1.1), accurately weighed, to the Kjeldahl flask, taking precaution to see that particles of the material do not stick in the neck of the flask. Add about 10 g of anhydrous sodium sulphate, about 0.2 to 0.3 g of copper sulphate and 20 ml of concentrated sulphuric acid. Place the flask in an inclined position. Heat below the boiling point of the acid until frothing ceases. Increase heat until acid boils vigorously and digest for 30 minutes after the mixture becomes pale green or colourless. Cool the contents of the flask.

Transfer quantitatively to the round bottom flask, with water, the total quantity of water used being about 200 ml. Add with shaking a few pieces of pumice stone to prevent bumping. Add about 50 ml of sodium hydroxide solution (which is sufficient to make the solution alkaline) carefully through the side of the flask so that it does not mix at once with the acid solution but forms a layer below the acid layer. Assemble the apparatus taking care that the tip of condenser extends below the surface of standard sulphuric acid contained in the beaker. Mix the contents of the flask by shaking and distil until all ammonia has passed over into the standard sulphuric acid. Shut off the burner and immediately detach the flask from the condenser. Rinse the condenser thoroughly with water into the beaker. Wash the tip carefully so that all traces of the condensate are transferred to the beaker. When all the washings have drained into the beaker, add two or three drops of methyl red indicator solution and titrate with standard sodium hydroxide solution.

F-3.2 Carry out a blank determination using all reagents in the same quantities but without the material to be tested.

F-4. CALCULATION

F-4.1 Protein

$$\begin{aligned} & \text{(on dry basis),} \\ & \text{percent by weight} = \frac{87\,500 (B-A)N}{W(100-M)} \end{aligned}$$

where

B = volume in ml of standard sodium hydroxide solution used to neutralize the acid in the blank determination,

A = volume in ml of standard sodium hydroxide solution used to neutralize the excess of acid in the test with the material,

N = normality of the standard sodium hydroxide solution,

W = weight in g of the material taken for the test, and

M = moisture, percent by weight, in the material (see C-2.1).

APPENDIX G

[Table I, Item (v)]

DETERMINATION OF CRUDE FIBRE

G-1. REAGENTS

G-1.0 The following reagents are required.

G-1.1 Dilute Sulphuric Acid — 1.25 percent (*w/v*), accurately prepared.

G-1.2 Sodium Hydroxide Solution — 1.25 percent (*w/v*), accurately prepared.

G-2. PROCEDURE

G-2.1 Dry to constant weight, about 5 g of the *prepared* material (see **G-1.1**) in an electric air oven at $105^{\circ} \pm 1^{\circ}\text{C}$. Weigh accurately about 2.5 g of the dried material into a thimble and extract for about one hour with petroleum ether, using a Soxhlet apparatus. Transfer the fat-free material to a litre flask. Take 200 ml of dilute sulphuric acid in a beaker and bring to boil. Transfer the whole of the boiling acid to flask containing the fat-free material and immediately connect the flask with a reflux water condenser and heat, so that the contents of the flask begin to boil within one minute. Rotate the flask frequently, taking care to keep the material from remaining on the sides of the flask out of contact with the acid. Continue boiling for exactly 30 minutes. Remove the flask and filter through fine linen (about 18 threads to the centimetre) held in a funnel, and wash with boiling water until the washings are no longer acid to litmus. Bring some quantity of sodium hydroxide solution to boiling under reflux condenser.

Wash the residue on the linen into the flask with 200 ml of the boiling sodium hydroxide solution. Immediately connect the flask with the reflux condenser and boil for exactly 30 minutes. Remove the flask and immediately filter through the filtering cloth. Thoroughly wash the residue with boiling water and transfer to a Gooch crucible prepared with a thin but compact layer of ignited asbestos. Wash the residue thoroughly first with hot water and then with about 15 ml of ethyl alcohol, 95 percent by volume. Dry the Gooch crucible and contents at $105^{\circ} \pm 1^{\circ}\text{C}$ in the air oven to constant weight. Cool and weigh. Incinerate the contents of the Gooch crucible in an electric muffle furnace at $600^{\circ} \pm 20^{\circ}\text{C}$ until all the carbonaceous matter is burnt. Cool the Gooch crucible containing the ash in a desiccator and weigh.

G-3. CALCULATION

G-3.1 Crude fibre
(on dry basis),
percent by weight = $\frac{100 (W_1 - W_2)}{W}$

where

W_1 = weight in g of Gooch crucible and contents before ashing,

W_2 = weight in g of Gooch crucible containing asbestos and ash, and

W = weight in g of the dried material taken for the test.

APPENDIX H

[Table I, Item (vi)]

DETERMINATION OF ALCOHOLIC ACIDITY

H-1. REAGENTS

H-1.0 The following reagents are required.

H-1.1 Neutral Ethyl Alcohol — 90 percent by volume.

H-1.2 Standard Alcoholic Sodium Hydroxide Solution — approximately 0.02 N.

H-1.3 Curcuma Indicator Solution — one percent (*w/v*) in ethyl alcohol.

H-2. PROCEDURE

H-2.1 Weigh accurately about 5 g of the *prepared* sample (see **G-1.1**) into a 100 ml conical flask provided with a ground glass stopper and add 25 ml of the neutral alcohol. Allow to digest for 24 hours with occasional shaking. Pipette 10 ml of the supernatant liquid into a conical flask and titrate

with the standard alcoholic sodium hydroxide using the curcuma indicator solution. The end point is indicated when the solution turns to chamois colour.

H-3. CALCULATION

H-3.1 Alcoholic acidity
(as H_2SO_4), with 90 percent
alcohol, percent by weight = $\frac{12.25 AN}{W}$

where

A = volume in ml of standard alcoholic sodium hydroxide solution used in titration,

N = normality of standard sodium hydroxide solution, and

W = weight in g of the material taken for the test.

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